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Age of patient at the extraction of the third molar

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Abstract. The purpose of this study was to assess the age of patients at the time of extraction of third molars. Our data included all routine and surgical extractions of third molars ($n = 8199$ teeth) performed by general and specialist dentists of the public oral health services of the city of Helsinki over the period 2013–2014. Measurements included patient's age, gender, the identified third molar, the type of anaesthesia, the method of extraction, and the diagnosis at extraction. Patients' ages ranged from 10 to 99 years. We found significant differences between younger and older age groups: third molar extractions occurred more often for women than for men below the age of 30 years ($P < 0.001$) and vice versa for patients older than 30. Extractions were more prevalent for the upper jaw ($P < 0.001$), and surgical extractions were more common than routine extractions ($P < 0.001$) below the age of 40 years, but the corresponding prevalences reversed after the age of 40 years. Diagnoses at extraction differed between younger and older patients. We conclude that the treatment pattern of third molars at public health services varies greatly over a lifetime, and that a greater variety exists than had been reported previously from oral and maxillofacial units.

Key words: third molar; extraction; operation; age; gender; diagnosis.

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The third molar is often referred to as the most commonly extracted tooth or it is associated with the most frequent surgical procedure. The most likely reason is because most studies of third molars are carried out by oral and maxillofacial surgeons and include patient samples from an oral and maxillofacial unit. Although these studies are very useful, they do not reveal the complete picture and the great variety in the treatment of third molars that exists in a population over a lifetime. Data on third molar studies are rarely gathered from primary care units with wide age ranges of patients that cover both routine and surgical extractions, and provided by both general and specialist dentists.

Little is known about how third molar extractions are distributed over the human lifespan. Epidemiological studies on the presence of third molars indirectly report the prevalence of extractions of third molars. According to these studies, two-thirds of all third molars are removed by the age of 30–40 years[1–4]. In addition, the mean age of patients at the time of extraction of third molars is usually reported from selected patient samples treated at oral and maxillofacial surgical units alone. The mean age may also reflect national trends[5].

Indications for the extraction of third molars reported mainly in studies on young adults treated at surgical units are not the same for patients belonging to one of the other age groups in the human lifespan. The initial indications in young adults, such as prophylactic or orthodontic reasons, impaction, and pericoronitis, change to caries and periodontal diseases later in life[6–10]. In addition, studies on data

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Table 1. The classification codes for procedures used in the search: based on the National Institute for Health and Welfare in Finland[11].

Code	Operation
EBA00	Extraction
EBA05	Difficult extraction
EBA10	Surgical extraction
EBA12	Difficult surgical extraction
EBA15	Extraction of several teeth[a]
EBA20	Hemisection
EBA30	Extraction of root
EBA40	Apicoectomy, single-rooted
EBA45	Apicoectomy, multi-rooted
EBA99	Other surgical extraction

[a] Extraction of at least four teeth from a jaw during infection control.

obtained from oral and maxillofacial surgery units are usually limited to surgical extractions. Surgical extraction, however, may not be the predominant method of extraction of third molars over a lifetime.

The aim of this present study was to assess the age of patients at the time of extraction of third molars. We analysed all third molar extractions performed in a public healthcare unit over a 2-year period, and this unit includes general and specialist dentists that treat patients of all ages. Furthermore, this studied unit, the Social Services and Health Care of the city of Helsinki, is the largest unit of its kind in Finland, which provides public oral healthcare services.

Material and methods

Approximately 190,000 patients visit the public oral healthcare services of the city of Helsinki annually. Our register-based data cover all extractions of third molars that occurred from January 2013 through December 2014 inclusively. The search listed all third molars with any code for tooth extraction (Table 1). We excluded those teeth with the codes EBA40 and EBA45 (apicoectomies), and EBA15 for extraction of several teeth during the same appointment (n = 237 teeth). In total, 8199 teeth were enrolled in the analysis.

We recorded in the data identification of the tooth and jaw, the diagnosis, the type of anaesthesia, the method of extraction, the patient's age and gender at the time of extraction. The method of extraction was dichotomized as routine extraction (EBA00, EBA05 and EBA30) or surgical extraction (EBA10, EBA12, EBA20 and EBA99). We recorded the diagnosis of extraction according to the 10th edition of International Classification of Diseases (ICD-10; Table 2).

The Department of Social Services and Health Care of the city of Helsinki granted permission to use these register-based data for research purposes (HEL 2014-012907). No additional institutional ethics committee approval was necessary because the study had no patient interventions in its protocol.

We categorized the age of the patients into the following age groups: 10–19 years, 20–29 years, 30–39 years, 40–49 years, 50–59 years, 60–69 years and 70 years and older. The χ^2 test was used for assessing differences in frequencies between these age groups, genders, jaws, and methods of extraction. The level of significance was set at P-values <0.01. IBM SPSS Statistics version 24 (IBM Corp., Armonk, NY, USA) was used for the data processing.

Results

During the 2-year period, 8199 third molars were extracted; 50.3% of the teeth were in men and 49.7% in women. Patients' mean age was 36.4 years (standard deviation (SD) 15.0) and the median age was 32 years (range 10–99). Extractions were carried out with local anaesthetic in 93% of the teeth, under sedation in 5%, and under general anaesthesia in 2%.

Extractions of third molars started abruptly in the late teens and the peak age for extraction was 23, 24 and 25 years equally (Fig. 1). Almost two-thirds of the extractions were performed between the ages of 20 and 39 years (Table 3). Women predominated for third molar extractions up to the age of 29 years, whereas men predominated from 30 years of age (χ^2 = 84.770; degrees of freedom (df) = 6; $P < 0.001$).

Slightly under half (49%) of the extracted third molars were in the maxilla and 51% in mandible. Extractions of upper third molars predominated up to the age of 39 years, and thereafter lower third molars from the age of 40 years on (χ^2 = 109.504; df = 6; $P < 0.001$; Table 3).

Routine extractions were the majority (72%), the rest (28%) were surgical extractions (Table 3). Surgical extractions were more likely to occur below the age of 40 years and routine extractions predominated after that (χ^2 = 178.221; df = 6; $P < 0.001$). Difficulty of the extractions was distributed as follows: 52% were extractions with forceps (EBA00 code), 15% difficult extractions (EBA05; e.g., with separation of the tooth without raising a flap), 24% surgical extractions (EBA10; e.g., raising a flap and/or osteotomia and/or separation of the tooth), 4% difficult surgical extractions (EBA12; deep and difficult impactions), and 5% were extractions of a root with forceps (EBA30).

Most of the diagnoses (92%) were attributed to the ICD10-class under the heading of Diseases of Oral Cavity, Salivary Glands and Jaws. The remaining diagnoses included among others fracture of the tooth (S02.5), dental examination (Z01.2), and convalescence following surgery (Z54.0). The most common diagnoses at extraction were gingivitis and periodontal diseases (23%; including, e.g., pericoronitis), diseases of pulp and periapical tissues (20%), dental caries (17%), and embedded and impacted teeth (13%; Fig. 2). Smaller frequencies, not shown in Fig. 2, were obtained for disorders of tooth development and eruption (K00; 7%), dentofacial anomalies (K07; 5%), other diseases of connective tissues and teeth (K08; 4%), and other miscellaneous diagnoses (11%). Diagnoses at ex-

Table 2. Main classes of the entity of Oral Cavity, Salivary Glands and Jaws according to the International Classification of Diseases[12] (10th Revision) and some examples found in the study.

Code	Diagnosis	Including
K00	Disorders of tooth development and eruption	Disturbances in tooth eruption
K01	Embedded and impacted teeth	Impacted tooth
K02	Dental caries	Caries of dentine
K03	Other diseases of hard tissues of teeth	Dental calculus
K04	Diseases of pulp and periapical tissues	Pulpitis, periapical abscess
K05	Gingivitis and periodontal diseases	Pericoronitis
K06	Other disorders of gingiva and edentulous alveolar ridge	Irritative hyperplasia
K07	Dentofacial anomalies (including malocclusion)	Temporomandibular joint disorders
K08	Other diseases of connective tissues and teeth	Retained dental root
K09	Cysts of oral region	Follicular cyst
K10	Other diseases of jaws	Alveolitis of jaws
K11	Diseases of salivary glands	–
K12	Stomatitis and related lesions	Submandibular abscess
K13	Other diseases of lip and oral mucosa	Cheek and lip biting
K14	Diseases of tongue	Black hairy tongue

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